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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/567,292  
Filing Date: February 06, 2006  
Appellant(s): ADUR ET AL.

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John H. Hornickel  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed November 24, 2009 appealing from the Office action mailed June 26, 2009.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

US 4,311,628	Abdou-Sabet	01-1982
US 3,578,614	Wszolek	05-1971
US 5,145,913	Gerber	09-1992
US 3,287,440	Giller	11-1966

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 3, 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abdou-Sabet (US 4,311,628) in view of Wszolek (US 3,578,614) and Gerber (US 5,145,913).

As to claims 1 and 3, Abdou-Sabet teaches thermoplastic vulcanizate using a phenolic curative, such as dimethylol-p-octyl phenol, in the presence of stannous chloride, zinc oxide and stearic acid (abstract; column 1, lines 19-58; column 3, lines 36-66; column 6, lines 23-68; column 8, lines 61-68; column 11, lines 19-68; Table V). Abdou-Sabet does not teach using one of:  $MgCl_2$ ,  $CaCl_2$ ,  $NaCl$ , or  $KCl$ . Abdou-Sabet does not teach using citric or oxalic acid. Wszolek teaches using alpha-hydroxy-carboxylic acids, such as citric acid, as a curing rate accelerator for curable polymer systems, which include ethylene/propylene/diene monomer (EPDM) systems (abstract; column 2, lines 1-27; column 3, lines 1-4, 26-52; column 7, lines 5-

30). It would have been obvious to use the curing accelerators of Wszolek with the thermoplastic vulcanizate of Abdou-Sabet because such accelerators achieve a commercially acceptable curing rate in less than ½ hour below 250°C from a liquid (Wszolek: column 1, lines 43-58).

Gerber teaches using sodium chloride, magnesium chloride, and calcium chloride for curing phenolic resins (abstract; column 1, lines 16-54; column 2, line 52-column 3, line 55; column 4, lines 62-68; column 5, lines 44-65; column 8, line 29-column 9, line 44; column 10, lines 1-27; column 12, lines 6-50; column 20, line 26-column 21, line 31). It would have been obvious to one of ordinary skill in the art to use the chlorides of Gerber with the thermoplastic vulcanizate of Abdou-Sabet because Gerber teaches the chlorides increase magnesium solubilization and replacement of magnesium hydroxide with the chloride increases the 24 hour room temperature compressive strength of the cured product (column 22, lines 42-48; column 24, lines 34-50).

As to claim 9, Abdou-Sabet teaches providing a catalyst system, as discussed in claim 1, in the presence of propylene and EPDM polymers and heating the mixture (column 8, line 61-column 9, line 9; Tables I-V).

As to claims 10-12, Abdou-Sabet teaches using 2.28 and 1.8 wt% of the metal activator and 4.32 wt% of phenolic curative in a Brabender mixer (column 4, line 51- column 5, line 17; column 9, lines 1-9; Tables IV and V).

As to claim 13, Wszolek teaches using 0.01-10.0 wt% of the carboxylic acid (column 2, lines 20-22). It is well settled that where prior art describes the components of a claimed compound or compositions in concentrations within or overlapping the claimed concentrations a

prima facie case of obviousness is established. See MPEP 2144.05; *In re Harris*, 409, F.3d 1339, 1343, 74 USPQ2d 1951, 1953 (Fed. Cir 2005); *In re Peterson*, 315 F.3d 1325, 1329, 65 USPQ 3d 1379, 1382 (Fed. Cir 1997); *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936-37 (CCPA 1990); *In re Malagari*, 499 F.2d 1297, 1303, 182 USPQ 549, 553 (CCPA 1974).

Claims 1, 3, 9-13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Giller et al., (US 3,287,440) in view of Wszolek. The discussion with respect to Wszolek as set forth in paragraphs 5-11 above is incorporated here by reference.

As to claims 1 and 3, Giller teaches a thermoplastic vulcanizate produced by using non-brominated phenolic resins, containing methylol groups, for curing elastomers using stearic acid and a group II metal chloride and the corresponding process (column 1, lines 14-32, 42-64; column 3, lines 1-73; column 4, lines 1-12; column 5, lines 1-64; column 6, lines 53-75; column 7, lines 5-59; column 8, lines 20-45). It would have been obvious to one of ordinary skill in the art that group II metal chlorides include magnesium chloride and calcium chloride. Giller does not teach using citric or oxalic acid.

Wszolek teaches using alpha-hydroxy-carboxylic acids, such as citric acid, as a curing rate accelerator for curable polymer systems, which include ethylene/propylene/diene systems (abstract; column 2, lines 1-27; column 3, lines 1-4, 26-52; column 7, lines 5-30). It would have been obvious to use the curing accelerators of Wszolek with the thermoplastic vulcanizate of Abdou-Sabet because such accelerators achieve a commercially acceptable curing rate in less than ½ hour below 250°C from a liquid (Wszolek: column 1, lines 43-58).

As to claim 9, Giller teaches providing a catalyst system, as discussed in claim 1, in the presence of propylene and EPDM polymers and heating the mixture (column 6, lines 53-75).

As to claim 10, Giller teaches about 3-4 wt% of phenolic resin (column 3, lines 5-10; column 8, lines 20-68).

As to claim 11, Giller teaches using a Branbury mixer (column 7, lines 19-31).

As to claim 12, Giller teaches using 3-4 parts by weight halide (column 7, lines 19-31; column 8, lines 20-45).

As to claim 13, Wszolek teaches using 0.01-10.0 wt% of the carboxylic acid (column 2, lines 20-22). It is well settled that where prior art describes the components of a claimed compound or compositions in concentrations within or overlapping the claimed concentrations a prima facie case of obviousness is established. See MPEP 2144.05; *In re Harris*, 409 F.3d 1339, 1343, 74 USPQ2d 1951, 1953 (Fed. Cir 2005); *In re Peterson*, 315 F.3d 1325, 1329, 65 USPQ 3d 1379, 1382 (Fed. Cir 1997); *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936-37 (CCPA 1990); *In re Malagari*, 499 F.2d 1297, 1303, 182 USPQ 549, 553 (CCPA 1974).

#### **(10) Response to Argument**

In response to applicant's argument based upon the age of the references, contentions that the reference patents are old are not impressive absent a showing that the art tried and failed to solve the same problem notwithstanding its presumed knowledge of the references. See *In re Wright*, 569 F.2d 1124, 193 USPQ 332 (CCPA 1977). Applicant has not provided evidence of that the art has tried and failed.

*Abdou-Sabet and Wszolek*

Applicant argues that Wszolek is an improper secondary reference because there is no connection between Wszolek and the primary reference Abdou-Sabet.

However, Abdou-Sabet teaches blends of olefin rubbers cured with phenolic curatives (abstract). The olefin rubbers are EPDM rubbers (col. 1, ln. 43).

Wszolek teaches the accelerated curing of a liquid comprising a polyene and a polythiol (col. 1, ln. 13-16). As described by Wszolek at col. 3, lines 26-32, polyene refers to simple or complex species of alkenes having a multiplicity of pendant, terminally or near terminally reactive carbon-carbon double bonds per average molecule. In particular, EPDM is a species of polyene as taught by Wszolek in col. 3, lines 1-4. Quoting: "Examples of said operable polyenes include, but are not limited to: ...(2) Ethylene/propylene/non-conjugated diene terpolymers" (col. 2, ln. 54-col. 3, ln. 4).

Thus, both Abdou-Sabet and Wszolek teach curing systems of EPDM polymers. While Wszolek teaches the curatives used include polythiols as opposed to the claimed phenolic resins, the instant claims make use of the "comprising" language and the claims do not exclude other components, specifically polythiols.

The instant specification defines a "thermoplastic vulcanizate" as a "type of thermoplastic elastomer, where the elastomer phase is partially or completely crosslinked, vulcanized or cured..." (see instant specification, pg. 3, ln. 6-9). The polymers of Wszolek satisfy this definition because EPDM is a type of thermoplastic elastomer (see instant specification pg. 9, ln. 9-16) which are cured (Wszolek: abstract).



While it is recognized that Wszolek teaches the general field of adhesives (Wszolek: col. 1, ln. 33-41), this does not necessarily mean that it does not also teach vulcanizates. It is noted that Applicant has not provided any evidence that adhesives and vulcanizates are mutually exclusive fields. Rather, the definition provided by the Applicant of "thermoplastic vulcanizate" does not restrict the vulcanizates to any specific use or exclude a vulcanizate from being used as an adhesive.

Additionally, while Wszolek teaches the general field of adhesives, Wszolek also teaches vulcanizates as defined by the instant specification because EPDM is a type of thermoplastic elastomer which are cured in Wszolek. Wszolek simply does not use the term "vulcanizate". However, even though this term is not used, this does not negate the teaching provided. Wszolek teaches curing polyenes (abstract) of which EPDM is included (col. 2, ln. 54-col. 3, ln. 4).

Alternatively, it is noted that EPDM polymers contain a number of points of unsaturation present as pendent vinyl groups, a result of the polymerization of a diene. These points of unsaturation lead to EPDM being classified as a "polyene", or a polymer with multiple double bonds present. Each point of unsaturation is a point where a curative can react to form a cured polymer system. In both the instant invention and Abdou-Sabet, these points of unsaturation are reacted with the phenolic resin. In Wszolek, these points of unsaturation are reacted with a polythiol. The curing reaction makes use of a catalyst to control the rate of reaction, either to speed it up or slow it down.

Wszolek has been relied on to show that catalysts, such as oxalic acid (col. 1, ln. 20-23) are known to act as a curing rate accelerator in the curing of polyenes, including EPDM (col. 2, ln. 54-col. 3, ln. 4).

Applicant states that "Appellants do not claim their use of citric acid and oxalic acid is new to the world as curing rate accelerators, just to EPDM." (See Appellant's Appeal Brief, pg 6, ln. 3-4). However, Wszolek teaches that oxalic acid, as a curing rate accelerator, with EPDM (Wszolek: abstract; col. 1, ln. 20-23; col. 2, ln. 54-col. 3, ln. 4).

One of ordinary skill in the art would have been motivated to use the oxalic acid of Wszolek because such accelerators achieve a commercially acceptable curing rate in less than ½ hour below 250°C from a liquid (Wszolek: column 1, lines 43-58).

#### *Abdou-Sabet and Gerber*

Applicant argues that Gerber does not apply because Gerber does not teach the curing of EPDM, but the curing of phenolic resins.

In response to applicant's argument that Gerber is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992).

In this case, the instant application is concerned with the delivery of better performing polymers (instant specification: pg. 1). Gerber is pertinent to the problem of better performing

polymers, because Gerber teaches the chlorides increase magnesium solubilization and replacement of magnesium hydroxide with the chloride increases the 24 hour room temperature compressive strength of the cured product (col. 22, ln. 42-48; col. 24, ln. 34-50).

Additionally, the instant invention is concerned with the curing of EPDM using phenolic resins and the rate of curing (instant specification: pg. 1, 4). Gerber is directed to controlling the rate of phenolic resole resin hardening (col. 1, ln. 16-21). It is noted that phenolic hardening corresponds to the curing of the phenolic resin. Furthermore, the rate of hardening corresponds to how quickly or slowly the resin cures. Therefore, the controlling curing rates described by Gerber is pertinent to the problem of how long it takes the composition to cure (instant specification: pg. 4, 7, 17 and 20).

Because Gerber is reasonably pertinent to the particular problem of the applicant, the delivery of better performing polymers or controlling phenolic resin curing rates, Gerber is analogous art.

Applicant argues that because the art of curing EPDM is unpredictable, the combination of Abdou-Sabet in view of Wszolek and Gerber would not be predictable. However, Wszolek teaches the use of alpha-hydroxy carboxylic acids, naming eight specific acids including citric acid, as accelerators achieve a commercially acceptable curing rate in less than ½ hour below 250°C from a liquid (Wszolek: column 1, lines 13-58; column 2, lines 24-27). Gerber teaches the chlorides increase magnesium solubilization and replacement of magnesium hydroxide with the chloride increases the 24 hour room temperature compressive strength of the cured product (column 22, lines 42-48; column 24, lines 34-50), which is a very specific cause and effect.

Therefore, while the art may be unpredictable, the references provide very specific reasons for using the particular combination provided in the rejection and make predictable solutions: using citric acid will achieve commercially acceptable curing rates and using chlorides increases magnesium solubilization.

*Giller and Wszolek*

Applicant argues that Wszolek is an improper secondary reference because there is no connection between Wszolek and the primary reference Giller.

Giller teaches the cross-linking or vulcanization of unsaturated plastics by phenol-aldehyde resins (col. 1, ln. 14-15) where the examples given show the unsaturated plastics are EPDM polymers (col. 8, ln. 20-32; col. 9, ln. 5-15, 42-52). Giller teaches that additional components may be added, which include acids such as stearic acid, palmitic acid, myristic acid and lauryl acid (col. 7, ln. 49-51). Giller does not recognize these acids as cure accelerators. However, there are chemical similarities between the acids of Giller and the claimed acids, in that both are carboxylic acids.

Wszolek teaches the accelerated curing of a liquid comprising a polyene and a polythiol (col. 1, ln. 13-16). It is noted that a "polyene" is a polymer with at least two unsaturated carbon-carbon bonds (col. 1, ln. 14-15) of which EPDM is a species: "Examples of said operable polyenes include, but are not limited to: ... (2) Ethylene/propylene/non-conjugated diene terpolymers" (col. 2, ln. 54-col. 3, ln. 4).

Thus, both Giller and Wszolek teach curing systems of EPDM polymers. While Wszolek teaches the curatives used include polythiols as opposed to the claimed phenolic resins, the

instant claims make use of the "comprising" language and the claims do not exclude other components, specifically polythiols.

The instant specification defines a "thermoplastic vulcanizate" as a "type of thermoplastic elastomer, where the elastomer phase is partially or completely crosslinked, vulcanized or cured..." (see instant specification, pg. 3, ln. 6-9). The polymers of Wszolek satisfy this definition because EPDM is a type of thermoplastic elastomer (see instant specification pg. 9, ln. 9-16) which are cured (Wszolek: abstract).

While it is recognized that Wszolek teaches the general field of adhesives (Wszolek: col. 1, ln. 33-41), this does not necessarily mean that it does not also teach vulcanizates. It is noted that Applicant has not provided any evidence that adhesives and vulcanizates are mutually exclusive fields. Rather, the definition provided by the Applicant of "thermoplastic vulcanizate" does not restrict the vulcanizates to any specific use or exclude a vulcanizate from being used as an adhesive.

Additionally, while Wszolek teaches the general field of adhesives, Wszolek also teaches vulcanizates as defined by the instant specification because EPDM is a type of thermoplastic elastomer which are cured in Wszolek. Wszolek simply does not use the term "vulcanizate". However, even though this term is not used, this does not negate the teaching provided. Wszolek teaches curing polyenes (abstract) of which EPDM is included (col. 2, ln. 54-col. 3, ln. 4).

Alternatively, it is noted that EPDM polymers contain a number of points of unsaturation present as pendant vinyl groups, a result of the polymerization of a diene. These points of unsaturation lead to EPDM being classified as a "polyene", or a polymer with multiple double

bonds present. Each point of unsaturation is a point where a curative can react to form a cured polymer system. In both the instant invention and Giller, these points of unsaturation are reacted with the phenolic resin. In Wszolek, these points of unsaturation are reacted with a polythiol. The curing reaction makes use of a catalyst to control the rate of reaction, either to speed it up or slow it down.

Wszolek has been relied on to show that catalysts, such as oxalic acid (col. 1, ln. 20-23) are known to act as a curing rate accelerator in the curing of polyenes, including EPDM (col. 2, ln. 54-col. 3, ln. 4).

Applicant states that "Appellants do not claim their use of citric acid and oxalic acid is new to the world as curing rate accelerators, just to EPDM." (See Appellant's Appeal Brief, pg 6, ln. 3-4). However, Wszolek teaches that oxalic acid, as a curing rate accelerator, with EPDM (Wszolek: abstract; col. 1, ln. 20-23; col. 2, ln. 54-col. 3, ln. 4).

One of ordinary skill in the art would have been motivated to use the oxalic acid of Wszolek because such accelerators achieve a commercially acceptable curing rate in less than ½ hour below 250°C from a liquid (Wszolek: column 1, lines 43-58).

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Art Unit: 1796

/ROBERT C BOYLE/

Examiner, Art Unit 1796

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/Vasu Jagannathan/

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